

## **Supplementary Online Content**

Brouwers HB, Chang Y, Falcone GJ, et al. Predicting hematoma expansion after primary intracerebral hemorrhage. *JAMA Neurol*. Published online December 23, 2013. doi: 10.1001/jamaneurol.2013.5433

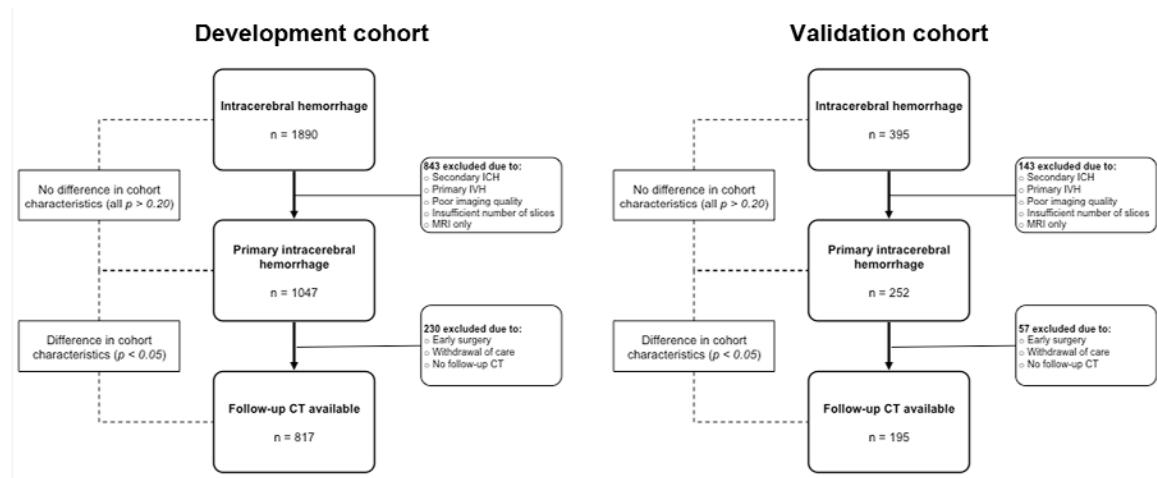
**eFigure.** Flowchart Development and Validation Cohorts

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This supplementary material has been provided by the authors to give readers additional information about their work.

**eFigure.** Flowchart Development and Validation Cohorts

Inclusion flowchart for the development (Massachusetts General Hospital [MGH], *left panel*) and validation (Brigham and Women's Hospital [BWH], *right panel*) cohorts. The breakdown for the excluded patients is (MGH / BWH): secondary ICH (n = 663 / n = 136), primary IVH (n = 44 / n = 5), poor imaging quality (n = 42 / n = 1), insufficient number of slices (n = 16 / n = 1), MRI only (n = 78 / n = 0), early surgery (n = 92 / n = 4), withdrawal of care (n = 28 / n = 7), and no follow-up CT (n = 110 / n = 46).

ICH = intracerebral hemorrhage; IVH = Intraventricular Hemorrhage

**eTable 1.** Validation Cohort Characteristics

Variable	All No (%)	No expansion No. (%)	Expansion No. (%)
<b>No. of patients</b>	<b>195 (100)</b>	<b>164 (84)</b>	<b>31 (16)</b>
Age (mean, SD)	71 (15)	71 (15)	71 (13)
Female sex	88 (45)	73 (45)	15 (48)
Warfarin use	40 (21)	33 (20)	7 (23)
Time to CT (median, IQR)	5.8 (3.5-8.5)	6.0 (4.1-8.5)	3.9 (1.6-6.4)
≤6 h	70 (39)	50 (34)	20 (67)
>6 h	109 (61)	99 (66)	10 (33)
ICH location			
Deep	96 (49)	81 (49)	15 (48)
Lobar	87 (45)	71 (43)	16 (52)
Brainstem	4 (2)	4 (2)	0 (0)
Cerebellar	8 (4)	8 (5)	0 (0)
Baseline ICH volume (median, IQR)	15 (6-44)	15 (5-39)	25 (9-76)
<30 mL	128 (66)	112 (68)	16 (52)
30-60 mL	31 (16)	27 (16)	4 (13)
>60 mL	36 (18)	25 (15)	11 (35)
Follow-up ICH volume (median, IQR)	16 (7-43)	14 (6-37)	52 (17-106)
Intraventricular extension	89 (46)	73 (45)	16 (52)
Baseline IVH volume* (median, IQR)	7 (3-16)	7 (3-15)	11 (3-51)
Follow-up IVH volume* (median, IQR)	7 (3-15)	6 (3-13)	18 (4-43)
CTA spot sign*	25 (19)	13 (11)	12 (67)

\* Data refers to ICH patients with intraventricular extension only (n = 89).

SD = Standard Deviation; IQR = interquartile range; ICH = intracerebral hemorrhage; mL = Milliliter; IVH = Intraventricular Hemorrhage; CTA = CT Angiography

**eTable 2. Univariate Analysis of Hematoma Expansion**

Variable	Odds Ratio (95% CI)	P Value
Age*	1.11 (0.96-1.28)	.15
Hypertension	1.45 (0.91-2.30)	.12
Antiplatelet**	1.03 (0.73-1.47)	.43
Warfarin	2.60 (1.77-3.82)	<.0001
GCS	0.97 (0.93-1.01)	.11
SBP*	0.95 (0.90-1.00)	.054
WBC	0.93 (0.85-1.03)	.17
Glucose*	0.99 (0.97-1.02)	.66
CAA	0.83 (0.50-1.40)	.49
APOE ε2	1.12 (0.64-1.94)	.13
Time to CT (≤ 6 vs > 6 h)	2.66 (1.63-4.33)	.0003
ICH location (Supra- vs. infratentorial)	1.93 (0.86-4.33)	.12
Baseline ICH volume		
30-60 vs <30 mL	1.66 (1.08-2.56)	.0006
>60 vs <30 mL	2.43 (1.49-3.96)	
CTA spot sign	5.99 (3.37-10.65)	<.0001

\* Per ten units increase.

\*\* Subgroups of antiplatelet agents we are also tested for association with hematoma expansion. These subset analyses returned similar results (data not shown).

GCS = Glasgow Coma Scale; SBP = Systolic Blood Pressure; WBC = White Blood Cell Count; CAA = Cerebral Amyloid Angiopathy; APOE = Apolipoprotein E; ICH = Intracerebral Hemorrhage; mL = Milliliter; CTA = CT Angiography

**eTable 3.** Prediction Score Performance for Hematoma Expansion and Mortality Excluding Patients on Warfarin

<b>Score</b>		<b>Total No. No. (%)</b>	<b>Expansion No. (%)</b>	<b>In-hospital mortality No. (%)</b>	<b>3-month mortality No. (%)</b>	<b>Validation cohort - expansion No. (%)</b>
<b>Individual points</b>	<b>Total</b>	<b>644 (100)</b>	<b>100 (16)</b>	<b>184 (29)</b>	<b>147 (23)</b>	<b>24 (15)</b>
	0	115 (18)	6 (5)	10 (9)	6 (5)	1 (4)
	1	N/A	N/A	N/A	N/A	N/A
	2	165 (26)	20 (12)	40 (24)	34 (21)	6 (10)
	3	185 (29)	24 (13)	37 (20)	23 (12)	3 (14)
	4	56 (9)	10 (18)	26 (46)	24 (43)	2 (12)
	5	84 (13)	22 (26)	51 (61)	42 (50)	4 (21)
	6	16 (2)	6 (38)	1 (6)	1 (6)	6 (75)
	7	6 (1)	2 (33)	4 (67)	4 (67)	0 (0)
	8	17 (3)	10 (59)	15 (88)	13 (76)	2 (50)
Categorized score	0	115 (18)	6 (5)	10 (9)	6 (5)	1 (4)
	3-Jan	350 (54)	44 (13)	77 (22)	57 (16)	9 (11)
	8-Apr	179 (28)	50 (28)	97 (54)	84 (47)	14 (28)